

Indicator: Quantity of RCRA Hazardous Waste Generated and Managed (069, 072)

Historically, uncontrolled dumping of wastes, including hazardous industrial wastes, was commonplace, with numerous entities handling and disposing of these materials. Landfills and surface impoundments containing these materials were unlined and uncovered, resulting in contaminated groundwater, surface water, air, and soil. Even with tight control of hazardous wastes from generation to disposal, the potential exists for accidents that could result in the release of hazardous wastes and their hazardous constituents into the environment.

Through the Resource Conservation and Recovery Act (RCRA) and the subsequent 1984 Hazardous and Solid Waste Amendments (HSWA), Congress sought to better control waste management and disposal and to conserve valuable materials and energy resources. The term “RCRA hazardous waste” applies to wastes that are ignitable, corrosive, reactive, or contain certain constituents at toxic levels.

Facilities that treat, store, or dispose of wastes are termed RCRA treatment, storage and disposal facilities (TSDFs). Some hazardous waste generators treat, store, and dispose of their hazardous waste on-site, while others ship their waste to TSDFs (if a generator stores waste longer than a brief time period, then the generator is considered to be a TSDF). Most hazardous waste eventually is disposed of in a land-based unit (a landfill, surface impoundment, land farming facility, or a site using deep well injection). All hazardous wastes disposed of in land-based units must be treated prior to disposal.

EPA, in partnership with states, collects extensive data only on the waste generation, management and disposal practices of “large quantity generators” (businesses that generate more than 2,200 pounds per month of RCRA hazardous waste as part of their regular activities) and TSDFs. These data are collected every two years. This indicator tracks trends in wastes generated and managed under the national RCRA hazardous waste program for two years: 1999 and 2001.

What the Data Show_ [2003 RCRA hazardous waste data were not available in time for this review, but will be for the final report]

In 1999, 38.2 million tons (MT) of RCRA hazardous wastes were generated and managed (Figure 069-1). To avoid potential double-counting, this does not include amounts for storage, bulking, and/or transfer. Seven percent (2.6 MT) of these wastes were sent to material recovery activities such as metal or solvent recovery, and 4% (1.6 MT) were sent for energy recovery. Twelve percent (4.7 MT) were treated, of which 32% (1.5 MT) were incinerated and 30% (1.4 MT) were stabilized or encapsulated (usually metal-bearing wastes). In 2001, the amount of RCRA hazardous waste generated dropped to 30.9 MT, a 19% reduction compared to 1999. Wastes sent for materials recovery decreased by 12% (2.3 MT), while wastes sent for energy recovery increased by 6% to 1.7 MT. There was a 36% decrease in the amount of RCRA hazardous wastes being treated, with 3 MT sent through treatment processes, but 1.6 MT were incinerated, a 6% increase over quantities incinerated in 1999. Quantities stabilized or encapsulated dropped from 1.4 MT in 1999 to 1.2 MT in 2001, a 14% decrease.

In 1999, 76% of hazardous wastes disposed of (29.2 MT) were disposed of on land: 26.9 MT were deep-well injected and 2.3 MT were placed in landfills or surface impoundments that became landfills (Figure 069-2). Disposal by deep well-injection accounted for 70% of the total amount RCRA hazardous waste generated and managed. In addition to the 38.2 MT, another 0.7 MT sat in storage for some time prior to final disposition (when they would be included in wastes recovered, treated, or disposed). In 2002, quantities of RCRA hazardous waste disposed on land showed an 18% decrease to 23.8 MT. Quantities deep-well injected decreased by 20% to 21.6 MT, but this remained the primary management choice, accounting for 70% of the wastes generated and managed. Landfills or surface impoundments that become landfills received 2.2 MT in 2001, a 4% decrease from 1999. The amount of RCRA hazardous

wastes sitting in storage prior to recovery, treatment, or disposal showed over a three-fold increase to 2.4 MT.

Indicator Limitations

- Data are not collected on wastes from all generators that generate less than 2200 pounds per month. However, wastes coming from these sources *are* included in the waste management data from treatment, storage, and disposal facilities that receive the wastes.
- RCRA is a state implemented program and states have the authority to designate additional wastes as hazardous, i.e., go beyond the national program. State-designated hazardous wastes are not tracked by EPA or reflected in the aggregated information presented
- Although RCRA regulations set controls to minimize threat to human health and the environment for wastes disposed of in a land disposal unit, the issue about whether managing treated hazardous wastes by land disposal is a permanently safe practice still exists.
- Most hazardous waste generated in this country is in the form of wastewater. The majority of these wastewaters are: 1) sent untreated to publicly-owned treatment works (POTW); 2) treated and sent to a POTW; or 3) discharged directly to surface waters through a National Pollutant Discharge Elimination System (NPDES) permit.
- Hazardous wastewaters generated and subsequently sent to POTWs or discharged through a NPDES permit are not included in this indicator.

Data Sources

RCRAInfo National Database. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. RCRAInfo. Data as of November 12, 2004.

<http://www.epa.gov/epaoswer/hazwaste/data/index.htm#rcra-info>

RCRAInfo contains a comprehensive web-enabled help module (RCRAInfo_Flat_File_WebHelp.zip) that supports direct queries of the Hazardous Waste Report Data Files. The help module explains the flat file specifications and data element values. (See ftp://ftp.epa.gov/rcrainfodata/rcra_flatfiles/). The flat files are provided to Envirofacts and the Right to Know Network and can be downloaded free of charge from EPA's publicly accessible FTP server (<ftp://ftp.epa.gov/rcrainfodata/brfiles/>).

Graphics

Figure 069-1. Management Trends for RCRA Hazardous Waste

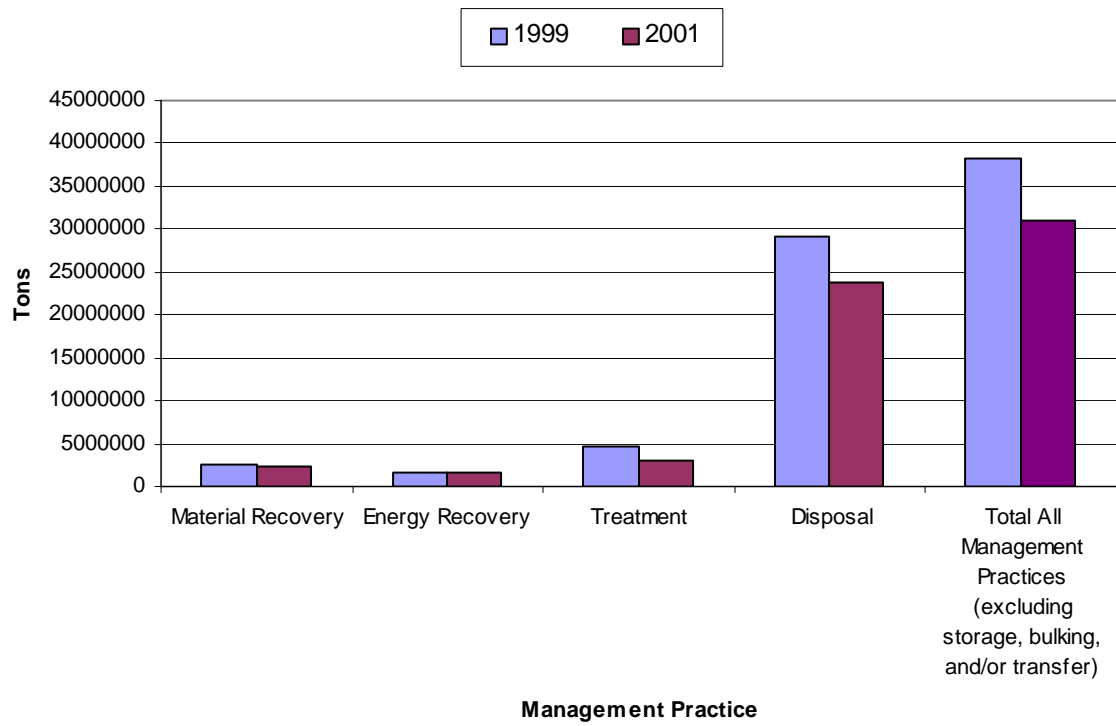
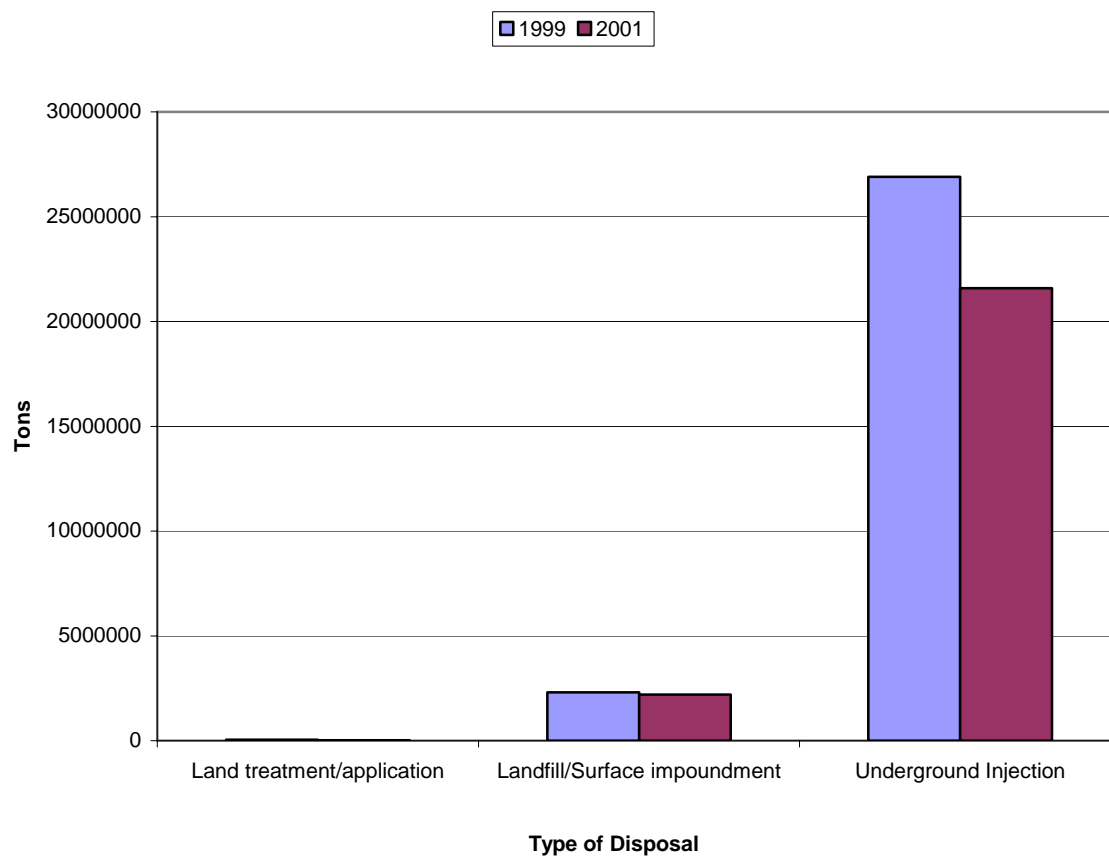


Figure 069-2: Final Disposal of RCRA Hazardous Waste by Practice



R.O.E. Indicator QA/QC

Data Set Name: QUANTITY OF RCRA HAZARDOUS WASTE GENERATED AND MANAGED

Indicator Number: 069 (89130)

Data Set Source: RCRAInfo.

Data Collection Date: regular: 1989 - 2001

Data Collection Frequency: 2 yrs

Data Set Description: RCRA Hazardous Waste Generated by Large Quantity Generators and Managed (combines indicators 069, 223, 072, 074)

Primary ROE Question: What are the trends in wastes and their effects on human health and the environment?

Question/Response

T1Q1 Are the physical, chemical, or biological measurements upon which this indicator is based widely accepted as scientifically and technically valid?

The RCRA hazardous waste program is a cradle to grave program and the level of regulation with which a facility must comply is based on the quantity of hazardous waste generated. Facilities are required to keep records of their wastes. Information submitted on hazardous waste comes from facility records such as:· Hazardous waste manifest forms;· Hazardous Waste Report forms submitted in previous years;· Records of quantities of hazardous waste generated or accumulated on site;· Results of laboratory analyses of your wastes;· Contracts or agreements with off-site facilities managing your wastes; and· Copies of permits for on-site waste management systems. A facility must specifically report the amount of waste, the unit of measurement (pounds, short tons, kilograms, metric tons, gallons, liters, or cubic yards) and the density.

T1Q2 Is the sampling design and/or monitoring plan used to collect the data over time and space based on sound scientific principles?

Yes. All RCRA Large Quantity Generators and RCRA Treatment, Storage and Disposal facilities are required to submit a Hazardous Waste Report every two years (for odd number years). The reporters complete the forms provided in the Hazardous Waste Report Instructions and Forms Booklet (EPA Form 8700-13 A/B) for the specific reporting year. Some states require reporting on their equivalent forms. RCRA hazardous wastes that must be reported are specifically listed in 40 CFR Part 261. Generally, regulations lay out two steps for determining if a facility is generating a hazardous waste. The first step is to check whether the waste being generated is on the list of wastes determined to be hazardous. The second step is to determine if the waste exhibits certain characteristics, i.e., ignitability, corrosivity, reactivity, or toxicity. The regulations state how to make these determinations. Since 1989, the RCRA hazardous waste program has collected information on RCRA hazardous wastes generated in this country. This is actually a statutory mandate. During the 1990 s, the RCRA hazardous waste program undertook several large efforts to identify additional wastes that should be added to the list of hazardous wastes. Also, the program sought to be more selective in the information it collected on RCRA hazardous waste. These efforts make information collected throughout the 1990 s somewhat inconsistent for examining trends. By 1999, program activities that could cause these types of trending difficulties stabilized. Therefore, this indicator uses 1999 as the baseline year for beginning a trend analysis. Data are not collected on the area of land used in the management of hazardous wastes.

T1Q3 Is the conceptual model used to transform these measurements into an indicator widely accepted as a scientifically sound representation of the phenomenon it indicates?

The submitted data are directly aggregated for indicators

T2Q1 To what extent is the indicator sampling design and monitoring plan appropriate for answering the relevant question in the ROE?

All RCRA Large Quantity Generators and RCRA Treatment, Storage and Disposal facilities are required to submit a Hazardous Waste Report (Biennial Report) every two years (for odd number years). The reported data provides information on the identity and location of hazardous waste generators and TSDFs. The reports describe and quantify the hazardous wastes that were generated and managed during the specific year. RCRA Sections 3002 and 3004.

<http://www.epa.gov/epaoswer/hazwaste/data/br03/forms.htm>

T2Q2 To what extent does the sampling design represent sensitive populations or ecosystems?

Not applicable.

T2Q3 Are there established reference points, thresholds or ranges of values for this indicator that unambiguously reflect the state of the environment?

No.

T3Q1 What documentation clearly and completely describes the underlying sampling and analytical procedures used?

Reporting requirements for the submitted data are specified in the Hazardous Waste Report Instructions and Forms Booklet (EPA Form 8700-13 A/B) for the specific reporting year. Some states require reporting on their equivalent forms. The booklets are available at -

<http://www.epa.gov/epaoswer/hazwaste/data/biennialreport/index.htm>

T3Q2 Is the complete data set accessible, including metadata, data-dictionaries and embedded definitions or are there confidentiality issues that may limit accessibility to the complete data set?

Yes. Hazardous Waste Report Data Files can be downloaded from the Internet.

<http://www.epa.gov/epaoswer/hazwaste/data/index.htm> RCRAInfo also contains a comprehensive web-enabled help module (RCRAInfo_Flat_File_WebHelp.zip) for those interested in directly querying the Hazardous Waste Report Data Files. This help module explains the flat file specifications and data element values. (See ftp://ftp.epa.gov/rcrainfodata/rcra_flatfiles/). In addition, these flat files are provided to Envirofacts and the Right to Know Network making them free for downloading from EPA's publicly accessible FTP server (<ftp://ftp.epa.gov/rcrainfodata/brfiles/>). Other related documents are at - <http://www.epa.gov/epaoswer/hazwaste/data/biennialreport/index.htm>

T3Q3 Are the descriptions of the study or survey design clear, complete and sufficient to enable the study or survey to be reproduced?

Yes. The Biennial Report for each specific year must be reviewed and approved by the Office of Management and Budget. EPA submits an Information Collection Request which describes the reporting universe, what data will be collected, the data collection instrument and process, the management of the data, and how it will be used. This process includes public review and comment through notices in the Federal Register.

T3Q4 To what extent are the procedures for quality assurance and quality control of the data documented and accessible?

For RCRA hazardous waste information, EPA coordinates a national review process with states and EPA regions when the initial data are compiled. EPA Headquarters, regions and states all perform data quality assurance. This includes follow-up with non-respondents, the detection and correction of unacceptable responses (e.g., where the respondent misunderstood the instructions), and the verification of exceptional data (e.g., data reported by a respondent differ significantly from data reported by the rest of the respondent universe) and significant response changes between reporting years. They identify cases where the state or region may want to confirm that data were entered correctly, and/or contact a regulated entity to confirm what they reported and provide them with the opportunity to submit an updated report if the original contained errors. The quality assurance and quality control plan documents are available from the Office of Solid Waste.

T4Q1 Have appropriate statistical methods been used to generalize or portray data beyond the time or spatial locations where measurements were made (e.g., statistical survey inference, no generalization is possible)?

Not applicable. The submitted data are aggregated.

T4Q2 Are uncertainty measurements or estimates available for the indicator and/or the underlying data set?

Not applicable.

T4Q3 Do the uncertainty and variability impact the conclusions that can be inferred from the data and the utility of the indicator?

Not applicable.

T4Q4 Are there limitations, or gaps in the data that may mislead a user about fundamental trends in the indicator over space or time period for which data are available?

All RCRA Large Quantity Generators and RCRA Treatment, Storage and Disposal facilities are required to submit a Hazardous Waste Report (Biennial Report) every two years (for odd number years). The reported data provides information on the identity and location of hazardous waste generators and TSDFs. The reports describe and quantify the hazardous wastes that were generated and managed during the specific year. The data do not include information on the area of land used by these facilities. Businesses that generate a substantial amount (i.e., more than 2,200 pounds per month) of RCRA hazardous waste as part of their regular activities are called large quantity generators (LQGs). National data on businesses that do not generate a substantial amount (called small quantity generators or conditionally-exempt small quantity generators depending on the amount) are not directly collected, although their quantities can be calculated through information submitted by TSDFs. There are a large number of these smaller generators and their contributions to the overall quantities of hazardous waste generated have not been adequately assessed.